

Research shows how a diet change might help US veterans with Gulf War illness

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A new study from American University shows the results from a dietary intervention in U.S. veterans suffering from Gulf War Illness, a neurological disorder in veterans who served in the Persian Gulf War from 1990 to 1991.

The veterans' overall number of symptoms were reduced and they experienced less [pain](#) and fatigue after one month on a [diet](#) low in glutamate, which is a flavor enhancer commonly added to foods, and that also functions as an important neurotransmitter in the nervous system.

Because the symptoms of GWI are similar to those of fibromyalgia, the U.S. Department of Defense provides funding for previously tested treatments in fibromyalgia that could also help veterans suffering from GWI. The low glutamate diet was previously shown to reduce symptoms in fibromyalgia, and thus, was a candidate for this funding. There are no cures for either illness, and treatments are being sought for both to manage chronic pain. GWI is thought to be connected to nervous system dysfunction in veterans. In the Gulf War, soldiers were exposed to various neurotoxins such as chemical warfare agents, pyridostigmine bromide (PB) pills, pesticides, burning oil fields, and depleted uranium.

"Gulf War Illness is a debilitating disorder which includes widespread pain, fatigue, headaches, cognitive dysfunction, and gastrointestinal symptoms. Veterans with GWI have a reduced quality of life as compared to veterans who do not have the illness," said AU Associate

Professor of Health Studies Kathleen Holton, who explores how food additives contribute to neurological symptoms and is a member of AU's Center for Behavioral Neuroscience. "In this study testing the low glutamate diet, the majority of veterans reported feeling better. We saw significant reductions in their overall number of symptoms and significant improvements in pain and fatigue."

The study, published in the journal *Nutrients*, details the experiments in a clinical trial of 40 veterans with GWI. The study participants were randomized to either immediately start the low glutamate diet for one month, or to a control group. After completion of the one-month diet, participants were challenged with monosodium glutamate and placebo to see if symptoms returned.

The challenge with MSG versus placebo resulted in significant variability in response among participants, with some subjects worsening, while others actually improved. This suggests that while a diet low in glutamate can effectively reduce overall symptoms, pain, and fatigue in GWI, more research is needed to understand how the diet may be altering how glutamate is handled in the body, and the specific role that nutrients may play in these improvements.

The role of glutamate

Glutamate is most easily identified when it is in the form of the [food additive](#) MSG; however, it appears most commonly in American diets hidden under many other food additive names in processed foods.

Americans also consume glutamate through some foods where it occurs naturally, such as soy sauce, fish sauce, aged cheeses like parmesan, seaweed, and mushrooms.

Glutamate is known to play a role in pain transmission, where it functions as an excitatory neurotransmitter in the nervous system. When

there's too much of it, it can cause disrupted signaling or kill cells, in a process called excitotoxicity. Previous research has shown that glutamate is high in pain processing areas of the brain in individuals with fibromyalgia and migraine. High concentrations of glutamate have also been linked to epilepsy, multiple sclerosis, Parkinson's disease, ALS, cognitive dysfunction (including Alzheimer's), and psychiatric issues such as depression, anxiety and PTSD.

In her research, Holton limits people's exposure to glutamate, while also increasing intake of nutrients known to protect against excitotoxicity. She analyzes how diet affects cognitive function, brain wave activity, brain glutamate levels, and brain function using MRI. In the study of veterans, the low glutamate diet was made up of whole foods low in additives and high in nutrients. Holton theorizes that the increased consumption of nutrients that are protective against excitotoxicity may have led to improved handling of glutamate in the nervous system. The study and diet tested in the veterans were similar to her previous studies, where she observed improvements in those with fibromyalgia, as well as in Kenyan villagers living with [chronic pain](#).

It will take more research to determine if reducing exposure to [glutamate](#) can be used as a treatment for chronic widespread pain and other neurological symptoms in U.S. veterans with GWI. Holton is currently pursuing funding for her next grant, which will recruit 120 veterans for a Phase 3 clinical trial to confirm the study's findings in a larger group, and further explore the mechanisms for these effects.

More information: Kathleen F. Holton et al, The Low Glutamate Diet Effectively Improves Pain and Other Symptoms of Gulf War Illness, *Nutrients* (2020). [DOI: 10.3390/nu12092593](https://doi.org/10.3390/nu12092593)

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